

R E M A R K S

Applicants are filing this Reply and Response under 37 CFR §1.111 in response to the Examiner's rejection of Applicants' Claims 1, 5, 6, 8-18, 25, 26, 28-49, 53, 54 and 56 under 35 U.S.C. §102(e) and Claims 4, 7, 19 and 27 under 35 U.S.C. §103(a).

The Rejections

Claim rejections under 35 U.S.C. §102(e)

Claims 1, 5, 6, 8-18, 25, 26, 28-49, 53, 54 and 56 stand rejected under 35 U.S.C. §102(e) as being unpatentable over Munson et al. (US 6,339,182).

The Examiner states:

Claim 1:

Munson discloses a method for separating olefins from a mixture comprising mono-olefins and di-olefins by contacting the mixture with an olefin-complexing metal salt dissolved, dispersed, or suspended in an ionic liquid to selectively complex the di-olefins over the mono-olefins. Desorbing the mono-olefins from the metal salt/olefin complex. (See abstract; col. 2, lines 1-20; col. 3, lines 50-53; Example 2).

Claims 5, 6, 8, 9, 25, 26, 28 and 29:

The metal salt comprises a Group IB (e.g., AgBF₄ and Cu salt). (See col. 4, lines 32-40; Table 3).

Claims 10 and 39:

The olefinic feed is a gaseous stream. (See col. 5, line 65).

Claims 30 and 31:

The non-olefins comprise paraffins including cycloparaffins. (See col. 3, lines 1-2).

Claims 18, 32-36:

The mono-olefins comprise ethylene which is produced from a cracker, Fischer-Tropsch synthesis, or paraffin dehydrogenation and is in a FCC unit. (See claims 10-15).

Claim 37:

The olefins are derived from the ethenolysis of heavier internal olefins. (See claim 16).

Claim 38:

Olefins are separated from a recycle stream in a Fischer-Tropsch synthesis. (See claim 17).

Claims 11 and 40:

Separating non-complex non-olefins from metal salt/olefin complex by distillation. (See col. 5, lines 49-51).

Claims 12, 13, 42 and 43:

Munson does not specifically disclose that mono-olefins and di-olefins are desorbed from the ionic liquid complex in the distillation. However, Munson discloses that the desorption step is effected in a packed tower or flash drum in using a combination of increasing temperature and lower pressure as disclosed in the present specification. Therefore, it would be expected that the Munson olefins be desorbed from the complex in a distillation column.

Claims 14 and 44:

The olefins are contacted with olefin-complex metal salt in liquid stirred tanks. (See col. 5, line 65 through col. 6, line 1).

Claims 15 and 45:

The non-olefins are separated from the ionic liquid complex by decantation. (See col. 5, lines 49-50).

Claims 16, 46 and 47:

The desorption step is in a regeneration apparatus. (See col. 5, lines 48-56).

Claims 17 and 48:

The ionic liquid solution removed from stripper is recycled back to the contacting zone. (See col. 6, lines 32-22).

Claim 24:

The ionic liquid is capable of forming a solution, suspension or dispersion with the olefin-complexing metal salt. (See Claim 1).

Claim 49:

Sulfur, nitrogen and acetylene are removed from the olefinic feed. (See col. 3, line 62 through col. 4, line 10).

Claims 53 and 54:

The ionic liquid comprises tetrafluoroborate and 1-butyl-3-methylinidazolium. (See Example 1 and Table 1).

Claims 55 and 56:

The ionic liquid is prepared as claimed. (See Example 2 and Claim 22).

Claims 2-4 and 20-24 are rejected under 35 U.S.C. §102(e) as anticipated by or, in alternative, under 35 U.S.C. §103(a) as obvious over Munson et al. (US 6,339,182).

The process of Munson is as discussed above.

Claims 20 and 22:

In addition, the presently claimed both mono-olefins and di-olefins are complexed with the ionic liquid complex would obviously have been provided as a result of contacting olefins with the ionic liquid complex because the Munson ionic liquid complex is the same as the claimed ionic complex. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 U.S.C. §102.

Claims 2, 21 and 23:

In addition, the presently claimed claims that di-olefins are desorbed from the ionic liquid complex would obviously have been provided as a result of desorbing olefins from the ionic complex. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 U.S.C. §102.

Claims 3 and 24:

The ionic liquid is capable of forming a solution, suspension or dispersion with the olefin-complexing metal salt. (See Claim 1).

Remarks

Applicants request the entry of this Reply and Response and for the reasons set forth below, Applicants traverse this rejection.

The applied reference has a common assignee with the instant application. The assignee for the applied reference is Chevron U.S.A. Inc. The assignee of the instant application is also Chevron U.S.A. Inc.

The inventors of the applied reference are Curtis L. Munson, Laura C. Boudreau, Michael S. Driver and William L. Schinski. The inventors of the present application are also Curtis L. Munson, Laura C. Boudreau, Michael S. Driver and William L. Schinski. All four inventors were employed by Chevron U.S.A. Inc. at the time they made the inventions covered by both the applied reference and the instant application and were obligated under their employment contract with Chevron U.S.A. Inc. to assign to Chevron U.S.A. Inc their inventions made in their capacity as Chevron U.S.A. Inc. employees.

Evidence for the Applicants' obligation to assign their inventions to Chevron U.S.A. Inc. is submitted in the attached copy of the employment contract all Chevron U.S.A. Inc. employees must sign as a condition of their employment.

Evidence for the common assignee is submitted in the attached copies of the assignment forms duly executed by each of the four inventors and recorded with the U.S. Patent and Trademark Office on December 12, 2000 in which the four inventors transfer all rights, interest and title in the applied reference to Chevron U.S.A. Inc.

Evidence for the common assignee is submitted in the attached copies of the assignment forms duly executed by each of the four inventors and recorded with the U.S. Patent and Trademark Office on March 29, 2002 in which the four inventors transfer all rights, interest and title in the instant application to Chevron U.S.A. Inc.

Thus, any invention disclosed but not claimed in the reference was derived from the inventors of this application and is not the invention by another.

Claim rejections under 35 U.S.C. §103(a)

Claims 4, 7, 19 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Munson et al. (US 6,339,182).

The Examiner states:

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. §103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and the invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. §103(c) and potential 35 U.S.C. §102(e), (f) or (g) prior art under 35 U.S.C. §103(a).

The process of Munson is as discussed above.

Claims 7 and 27:

Munson does not disclose that the metal salt is CuOTf. However, Munson discloses that the metal salt is a Cu(I). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the process of Munson by using the claimed metal salt because one of skill in the art would use any Cu(I) salt, including the claimed copper salts because it would be expected that any Cu(I) salt would affect the process of Munson.

Claim 19:

Munson does not specifically disclose that the mixture is partially hydrogenated prior to the contacting step. However, Munson discloses that the mixture is hydrogenated prior to the contacting step.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Munson by partial hydrogenating the mixture because partial hydrogenation would hydrogenate acetylene without hydrogenating mono-olefins. (See col. 4, lines 5-8).

Claim 4:

Munson does not specifically disclose that the amount of olefin-complex metal salt is adjusted so as to complex essentially only the di-olefins.

Munson discloses that the selective complexation of dienes (di-olefins) is over mono-olefins. (See col. 10, lines 46-49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the process of Munson by adjusting the amount of the olefin-complex metal salt as claimed because it is within one of skill in the art to adjust the amount of complex metal salts to separate the di-olefins completely from mono-olefins which in turn would provide a purer di-olefins and mono-olefins products.

Remarks

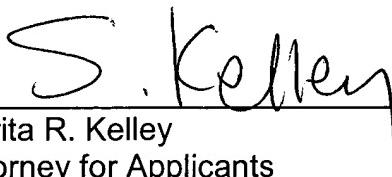
Applicants confirm that all the claims were commonly owned at the time the invention was made.

Allowable Subject Matter

An indication by the Examiner that Claims 50-52 contain allowable subject matter over the prior art of record is noted with appreciation.

For the foregoing reasons, it is submitted that Applicants' Claims 1-56 are in a condition for allowance. Accordingly, allowance of Claims 1-56 is respectfully requested.

Respectfully submitted,



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Enclosures

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